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An Investigation of Work-Related Risk Factors Among Sewing Machine Operators in Bangladesh

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Working extended periods of time in front of sewing machines may cause discomfort to the operators of sewing machines. Sewing machine operators sit for extended periods of time and use their hands to control, handle, or feel objects and tools in repetitive processes which makes them vulnerable to musculoskeletal symptoms (Kerrgaard and Andersen, 2000). There have been limited studies on how the working environment impacts sewing machine operators in the apparel industry, especially in top apparel exporter countries like Bangladesh. Bangladesh is the second largest apparel manufacturing country in the world after China. Around 3.5 million people work in apparel industries in Bangladesh, mostly in the apparel manufacturing industry (Haque et. al., 2018). Therefore, this study aims to identify the prevalence of musculoskeletal symptoms among sewing machine operators working in the apparel industry in Bangladesh while considering job characteristics, productivity, job satisfaction, workstation design, and working environment.

This study was conducted in a sewing department of an apparel factory in Gazipur, Dhaka, Bangladesh that manufactures clothing. Twenty-seven voluntary participants were recruited from the factory. We used a questionnaire and direct observation to collect data from these workers. The questionnaire had a total of six sections. In the first section we asked about demographics, height, weight, non-work related physical activity, and health. The second section included questions about the participants' job descriptions, such as the number of years worked as an operator, daily working hours, daily work in a week, weekly working hours, average productivity per hour, types of products, and types of machines used in the factory. In the third section, participants answered questions regarding productivity and job satisfaction which included the duration of continuous work and working hours without a break, pressure due to work, and overall job satisfaction. The fourth section had questions about the workstation design including the use of an adjustable chair, the height of the table and chair, the distance between the chair height and the table height, and satisfaction with the sewing machine design for effective operation. In the fifth section, information was collected regarding the environment of the sewing floor such as noise, heat, and levels of distraction while working in the factory. In the sixth and final section, operators were asked to evaluate their working postures at the workstations which was later used to find out the prevalence of musculoskeletal symptoms using a valid and reliable scale- Rapid Upper Limb Assessment (RULA) (McAtamney and Corlett, 1993). RULA scores were calculated based on the method described by Dianat et. al. (2015).

Out of the 27 participants, 12 (44.44%) were men and 15 (55.56%) were women. The average age of the participants was 25 years. The average height and weight of the participants were 5 feet 2 inches and 121 pounds respectively. Out of 27 participants, 77.78% were married. The average monthly salary of the operators was $142. The results showed that 14.81% of the operators were illiterate, whereas 89.18% went to high school. 22.22% of the participants mentioned that they performed some kind of physical activity such as exercise, running etc., 18.52% mentioned that they smoked, and 14.81% reported that they had some kind of chronic illness. The average number of years these operators had worked in the factory was 3 years and each operator worked 48-60 hours in 6 days of the week. Most of the operators used plain sewing machines, overlock machines, or flatlock machines. 66.67% of the total operators mentioned that they performed continuous work for at least 1 to 2 hours without any break (>10 minutes), whereas 22.22% worked continuously for 2-3 hours. All participants mentioned taking a 45-60 minutes break during their lunch time and 62.96% participants mentioned that they felt somewhat stressed due to work; 18.52% participants mentioned they were not satisfied with their current job. Additionally, none used the adjustable chairs in the sewing department. The average height of the chairs and the tables were 18.78 inches and 32.85 inches, respectively; 11.11% of the workers thought that the distance between the chair and the table height was not adequate. And while 81.48% were somewhat satisfied with the sewing machine design, 18.51% were unhappy with the design. When asked about the environment of the sewing floor, 62.96% reported too much noise on the sewing floor, 48.15% found the room to be too warm, and 44.44% mentioned that there were too many distractions. Finally, the RULA mean score for A(arm/wrist), B (neck/trunk/leg), and grand score, was 3 (range: 2-4), 3.33 (range: 2-6), and 4.70 (range: 2-8) respectively. In general, participants felt pain in upper arms, lower arms, hands/wrists, shoulders, upper back, lower back, knees, ankles/feet, and hips.

The results showed that working in front of the sewing machines for a long period of time might cause musculoskeletal problems for the sewing machine operators which is consistent with previous studies (Ozturk and Esin,1993). Further, the environment of the sewing machine rooms, job characteristics, and workstation design were not satisfactory in some cases and might impact participants' health. Future studies should run statistical analyses to address the direct impact of the variables on the musculoskeletal problems. Moreover, comprehensive studies should be performed with a larger sample size. Finally, further studies should be performed to provide detailed guidelines for the improvement of the work environment for the operators.

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